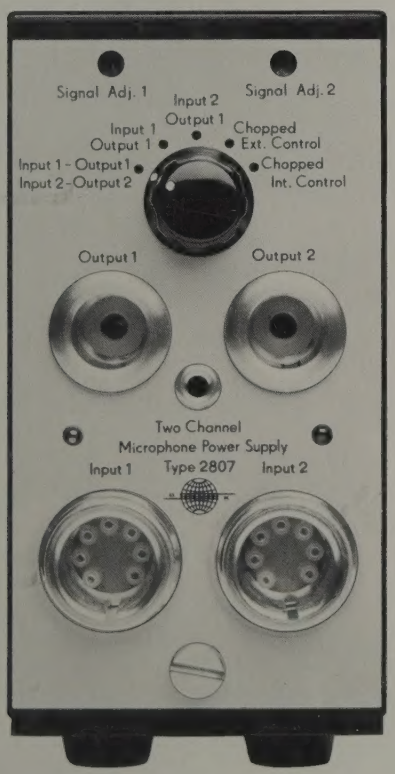
2807

Instruction Manual

Two Channel Microphone Power Supply Type 2807



A compact instrument of modular construction which provides the necessary supply voltages for the connection of two B & K Microphone Preamplifiers Type 2633, 2639, 2645 and 2660, and the 200 V polarization voltage required for the associated B & K Condenser Microphones. Low impedance outputs enable long cables to be connected to the indicating instruments. The two channels may be monitored simultaneously, automatically switched internally at a frequency of approximately 0,5 Hz, or switched remotely when used in conjunction with B & K Level Recorder Type 2307.

B K Brüel & Kjær

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TWO-CHANNEL MICROPHONE POWER SUPPLY
TYPE 2807

From serial no. 1286418

Revision January 1986

SAFETY CONSIDERATIONS

This apparatus has been designed and tested according to Class I of IEC Publication 348, Safety Requirements for Electronic Measuring Apparatus, and has been supplied in safe condition. The present Instruction Manual contains information and warnings which should be followed by the user to ensure safe operation and to retain the apparatus in safe condition. Special note should be made of the following:

APPLICATION OF POWER

Before each use of the apparatus, check that it is set to match the available mains voltage and that the correct fuse is installed.

For maximum operating safety the protective conductor (green/yellow) of the power cable must be connected to a suitable earth, such as the protective earth contact of a mains socket outlet.

SAFETY SYMBOLS

⚠ The apparatus will be marked with this symbol when it is important that the user refer to the associated warning statements given in the Instruction Manual.

⊥ Chassis terminal ⏚ Safety earth terminal ↯ Hazardous voltage.

WARNINGS

Whenever it is likely that the correct function or operating safety of the apparatus has been impaired, the apparatus must be made inoperative and be secured against unintended operation.

Any adjustment, maintenance and repair of the open apparatus under voltage must be avoided as far as possible and, if unavoidable, must be carried out only by trained service personnel.

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Two-Channel Microphone Power Supply

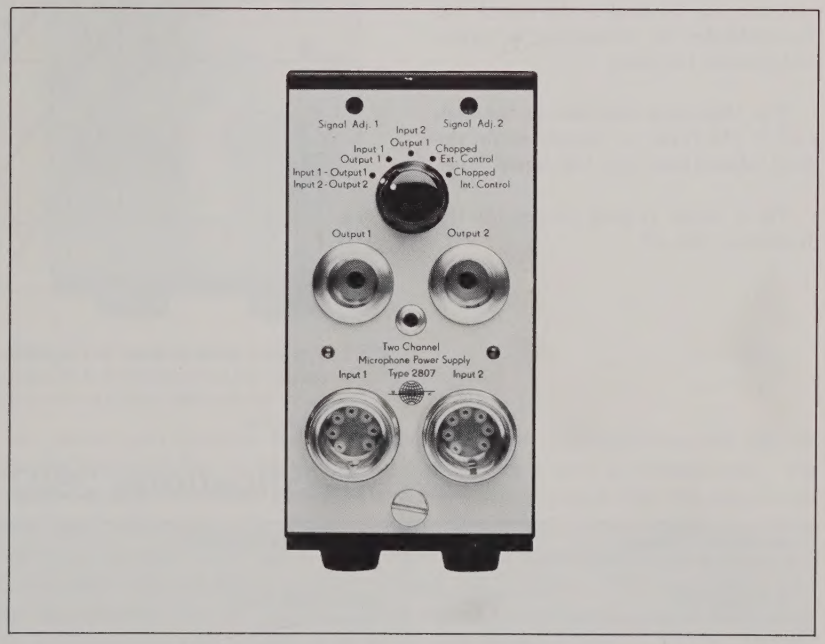
FEATURES:

- Two signal channels with manual and automatic switching
- Frequency range 2 Hz to 200 kHz
- Cross-talk less than 60 dB
- Channel attenuation adjustable between 0,15 dB and approximately 40 dB
- Allows use of long cables between transducer and measuring instrumentation
- Outputs short circuit protected
- Fits B & K module system for rack mounting

USES:

- Power Supply for two microphone assemblies or preamplifiers
- Sound insulation measurements with B & K condenser microphones
- Vibration measurements with B & K accelerometers
- Remote switching between measuring points
- Simultaneous tape recording of sound and vibration data

The Two-Channel Microphone Power Supply Type 2807 is designed for use in connection with the B & K Microphone Preamplifiers Types 2633, 2639, 2645 and 2660. The 2807 supplies the necessary power for the preamplifiers and the 200 V polarization voltage for associated condenser microphones. In connection with preamplifiers, the 2807 acts as an impedance transformer with high input impedance and low output impedance allowing the use of long cables between the output of the 2807 and the equipment following it.



The 2807 further enables the use of the two channels simultaneously giving the possibility of measuring, for instance, sound and vibration at the same time, and the choice of manual or automatic switching between the two channels to one set of recording instruments connected to the output. This feature gives the possibility of building up measuring systems having the advantage of simplicity and flexibility.

Description

As can be seen from the block diagram (Fig. 1) the 2807 consists of a power supply, two identical signal channels and a switching circuit.

The power supply gives the stabilised 200 V polarization voltage needed for condenser microphones and the power required for the various B & K preamplifiers.

The two signal channels each consist of a seven pin B & K standard input socket, a multiturn potentiometer acting as an attenuator having the approximate range of 0 dB to −40 dB re the nominal sensitivity of the input transducer, and a "push-pull" amplifier acting as an impedance transformer with 13 Ω in series with 4,7 μF output impedance and an attenuation of less than 0,15 dB within the frequency range 2 Hz to 200 kHz.

The amplifiers are connected to the two output sockets by the function selector which has the following five modes:

1. Input 1 to Output 1
   Input 2 to Output 2

2. Input 1 to Output 1
   Input 2 disconnected
   Output 2 grounded

3. Input 2 to Output 1
   Input 1 disconnected
   Output 2 grounded

4. "Chopped Ext. Control"
   Externally controlled switching between the two inputs to Output 1

5. "Chopped Int. Control"
   Switching between the two inputs and Output 1 controlled internally with a switching frequency of approx. 0,5 Hz.

Two lamps indicate which input is active.

The automatic channel selector consists of a relay controlled by an astable multivibrator. For external control (mode 4) a Level Recorder 2307 for instance can be used or the switch can be controlled by grounding the external control terminal.

The frequency response at the high end of the range is dependent on the load capacitance and the signal level.

Fig. 2 shows typical curves for the frequency cut-off.

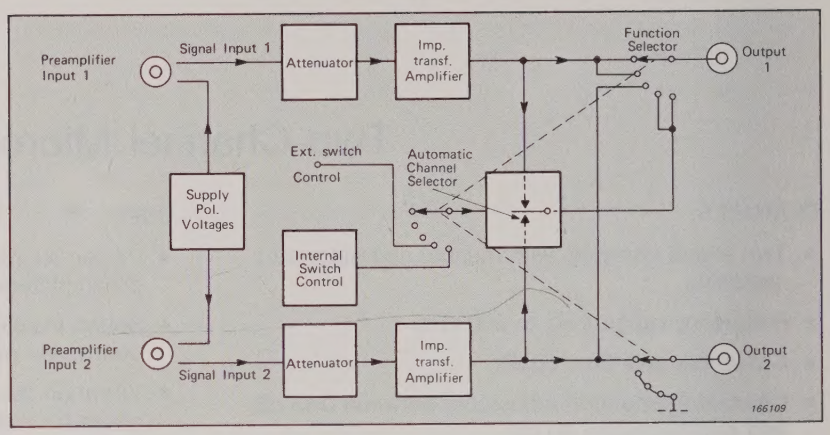


Fig. 1. Block diagram of 2807

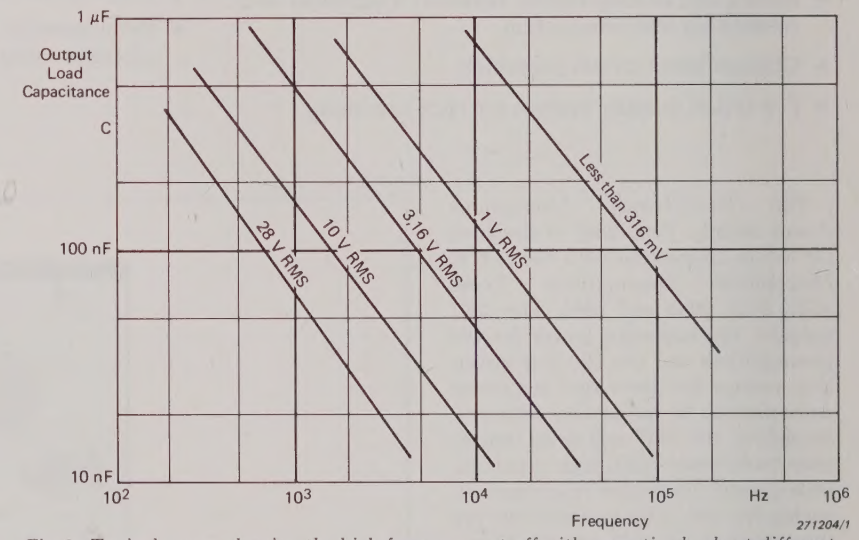


Fig. 2. Typical curves showing the high frequency cut-off with capactive loads at different output levels (Standard B & K coaxial cable capacitance is less than 100 pF/m). The curve to the right indicates the 3 dB limits, the others indicate the limits for 1% distortion

Specifications 2807

FREQUENCY RANGE:
2 Hz to 200 kHz (± 0,2 dB)

ATTENUATION:
< 0,15 dB. Adjustable down to −40 dB approx.

OUTPUT VOLTAGE:
28 V RMS (2 Hz to 20 kHz)

MAX. OUTPUT CURRENT:
8 mA RMS per channel

OUTPUT IMPEDANCE:
13 Ω in series with 4,7 μF

INHERENT NOISE:
< 15 μV (20 Hz to 200 kHz)

CROSS-TALK ATTENUATION:
> 80 dB up to 20 kHz
> 60 dB at 200 kHz

CHOPPER FREQUENCY:
approx. 0,5 Hz

SWITCHING TIME:
Typical 1 ms

POLARIZATION VOLTAGE:
200 V. Stability better than 0,5% for ± 10% variation of mains-voltage

POWER SUPPLY:
100, 115, 127, 220, 240 V
(50 to 400 Hz) ± 10% AC 10 VA
Complies with IEC 348 safety class I

PREAMPLIFIER SUPPLY VOLTAGES:
(for Input Sockets 1 and 2)
Preamplifier Supply:
+ 150 V (EMF), 16 kΩ source, Max. 2 mA
Preamplifier Heater Supplies:
+ 12,6 V(EMF), < 0,1 Ω source
+ 12,6 V(EMF), 30 Ω source
The sum of the currents from the two heater supplies should not exceed 80 mA

DIMENSIONS:
Height: 132,6 mm (5,2 in)
Width: 69,5 mm (2,6 in)
Depth: 200 mm (7,9 in)
(B & K module cabinet KK 0022, 2/12 of 19″ rack module)

WEIGHT:
2,2 kg (4,9 lb)

ACCESSORIES INCLUDED:
1 Power cord..... AN 0010
Fuses
Two adaptors DB 2609 for connecting earlier type B & K male plugs to input

2. CONTROLS

2.1. FRONT PANEL

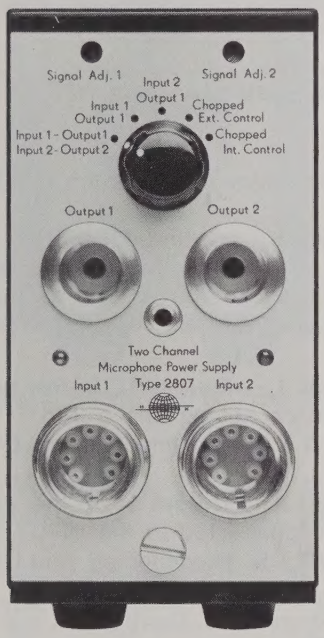


Fig. 2.1. Front Panel of Type 2807

INPUTS 1 and 2:

Two seven-pin sockets for connection of B & K Microphone and Microphone Preamplifier combinations to channels 1 and 2 respectively. Via these sockets the 2807 provides the necessary power for the preamplifier and the polarization voltage for the microphone cartridge. The sockets accept B & K plug JP 0715. For pin connections, see Fig. 2.2. B & K Microphone Preamplifiers Types 2633, 2639, 2645 and 2660 may be connected directly to the sockets and Preamplifier Type 2642 may be connected using adaptor JP 0713, see section 3.2.

These sockets are also used as inputs to channels 1 and 2 for vibration measurements using B & K Accelerometers. See section 3.4.

INDICATORS 1 and 2:

Two lamps located above INPUTS 1 and 2 indicating which input is active.

SIGNAL ADJ. 1 and 2:

Two multi-turn potentiometers for independent adjustment of the input signal to each channel. The range of attenuation is from 0 to 40 dB.

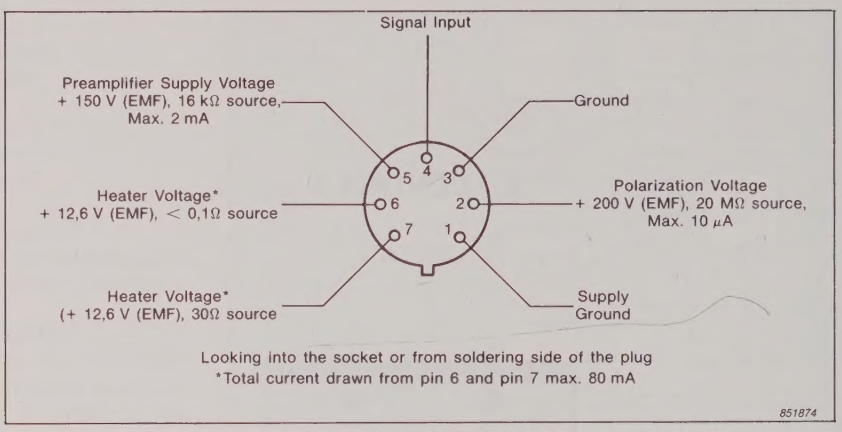

Signal Input
Preamplifier Supply Voltage
+ 150 V (EMF), 16 kΩ source,
Max. 2 mA
Ground
Heater Voltage*
+ 12,6 V (EMF), < 0,1Ω source
Polarization Voltage
+ 200 V (EMF), 20 MΩ source,
Max. 10 μA
Heater Voltage*
(+ 12,6 V (EMF), 30Ω source
Supply
Ground
Looking into the socket or from soldering side of the plug
*Total current drawn from pin 6 and pin 7 max. 80 mA
851874

Fig. 2.2. External view of sockets INPUT 1 and INPUT 2

FUNCTION SELECTOR:

Five position rotary switch with the following settings:

"Input 1 — Output 1. Input 2 — Output 2." In this position the input and output of channel 1 are connected to the INPUT 1 and OUTPUT 1 sockets respectively, and the input and output of channel 2 are connected to the INPUT 2 and OUTPUT 2 sockets respectively.

"Input 1 — Output 1." In this position the input and output of channel 1 are connected to the INPUT 1 and OUTPUT 1 sockets respectively, INPUT 2 is disconnected, and OUTPUT 2 is grounded.

"Input 2 — Output 1." In this position the input and output of channel 2 are connected to the INPUT 2 and OUTPUT 1 sockets respectively, INPUT 1 is disconnected, and OUTPUT 2 is grounded.

"Chopped Ext. Control." In this position the facility for externally controlled chopping of the two input signals is available. The chopped output signal is available at the OUTPUT 1 socket. OUTPUT 2 is grounded. See section 3.3.

"Chopped Int. Control." In this position the outputs from channel 1 and 2 are chopped internally at a switching frequency of approximately 0,5 Hz. The chopped output signal is available at the OUTPUT 1 socket. OUTPUT 2 is grounded.

OUTPUTS 1 and 2:

Two standard B & K coaxial sockets which, depending on the position of the FUNCTION SELECTOR, are connected to the outputs of channels 1 and 2. The sockets accept B & K coaxial plugs JP 0101. The output impedance is 13 Ω in series with 4,7 μF.

CHASSIS GROUND:

Socket for connection of the chassis of the 2807 to ground. The socket accepts banana plug JB 0002.

⚠ **WARNING:** The 2807 is designed to be operated with its signal ground lines and chassis always at earth potential. Never let the signal ground terminals, socket screens or chassis float at any other potential, as this will impair the operating safety of the 2807 and may damage the instrument.

2.2. REAR PANEL

Fig. 2.3. Rear Panel of Type 2807

POWER ON: Toggle switch for supplying AC mains power to the 2807. The "up" position is ON.

POL. VOLTAGE: Socket for measurement of the polarization voltage using a high input impedance digital voltmeter. A CHASSIS GROUND socket is located to the right of the POL. VOLTAGE socket for ground connection of the voltmeter. Both POL. VOLTAGE and CHASSIS GROUND sockets accept banana plugs JB 0002. For details of polarization voltage measurement and adjustment procedure, see section 3.1.4.

EXT. CONTROL: Socket for connection of a suitable instrument for external control of signal chopping between channels 1 and 2 when the FUNCTION SELECTOR is set to "Chopped Ext. Control". Accepts banana plug JB 0002. The chopped signal output is available at the OUTPUT 1 socket. OUTPUT 2 is grounded. See section 3.3.

OUTPUTS 1 and 2: Two miniature coaxial sockets which are connected in parallel with the respective OUTPUT 1 and OUTPUT 2 sockets on the front panel. These sockets accept miniature coaxial plug JP 0012.

MAINS INPUT: Three pin socket for connection of an AC mains supply to the 2807. Accepts Power Cable AN 0010. Power consumption is approximately 10 VA.

Note: Before connecting the apparatus to a mains supply, the mains voltage setting and fuse checks given in section 3.1.2 should be carried out.

2.3. BOTTOM PANEL

Fig. 2.4. Bottom Panel of Type 2807

FUSE AND VOLTAGE SELECTOR:

The MAINS VOLTAGE SELECTOR and MAINS FUSE HOLDER are located beneath the bottom panel of the 2807. Details of the mains voltage adjustment and mains fuse replacement procedure are given in section 3.1.2.

3. OPERATION

3.1. PRELIMINARY

3.1.1. Mounting

The 2807 may be used free standing on its four rubber feet, or installed in a rack or cassette system for use with other instruments. For details of the cabinet and cassette systems available, see the B & K Short Form and Main Catalogues.

3.1.2. Connection of Mains Supply

Before connecting a mains supply the following checks and adjustments should be carried out to ensure safe operation of the instrument. The MAINS FUSE HOLDER and MAINS VOLTAGE SELECTOR are located beneath the bottom panel of the 2807. To remove the bottom panel, loosen the screw located on the lower part of the front panel and slide the bottom panel out towards the rear.

Mains Voltage Setting

The 2807 may be operated from a 100, 115, 127, 220 or 240 V ± 10%, 50 to 400 Hz, single-phase Ac mains supply. To set the required mains voltage, remove the bottom panel as described above and unscrew the central knob of the FUSE AND VOLTAGE SELECTOR. This is the MAINS FUSE HOLDER. The mains voltage is set by rotating the bush until the desired value is indicated by the red marker. Replace the MAINS FUSE HOLDER and the bottom panel.

Mains Fuse Rating

To fit or replace a mains fuse, remove the bottom panel as described above and unscrew the fuse holder. For operation from a 220 or 240 V AC mains supply an 80 mA slow blow fuse (B & K No. VF 0046) should be used. At lower operating voltages, a 160 mA slow blow fuse (B & K No. VF 0051) should be used.

Note: Make sure that only fuses with the required current rating and of the specified type are used for replacement. On no account use mended fuses or short circuit the fuse holders.

Mains Socket Connections

Once the mains voltage setting and fuse have been checked, the mains supply may be connected to the MAINS INPUT socket using the Power Cable AN 0010 provided. To fit a suitable mains plug to the cable, see Fig. 3.1.

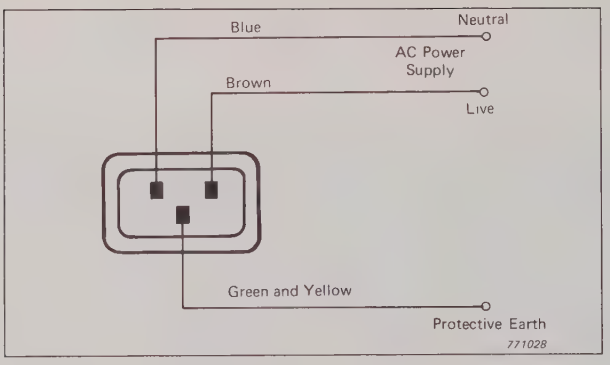


Fig. 3.1. Connection of mains supply to MAINS INPUT socket of 2807

For maximum operating safety the protective (green/yellow) conductor of the power cable should be connected to a suitable earth, such as the protective earth contact of a mains socket outlet. The use of extension cables without protective conductor shall be avoided.

In countries where the use of a mains socket outlet without protective conductor is standard, the mains supply should incorporate an authorised earth leakage current circuit breaker.

3.1.3. Grounding Considerations

The signal ground lines of the 2807 are permanently connected to its chassis. This is done at one point only to obtain the best possible immunity to mains carried noise. However, when using the 2807 together with other mains operated equipment in complex measurement set-ups, indiscriminate grounding of the instrument signal ground lines can introduce mains hum and noise. If this is found to interfere with measurements or recordings then it may be eliminated by ensuring that the signal ground line of the entire measurement set-up is not grounded at more than one point. To do this without impairing the operating safety of the instruments, proceed as follows.

1. Connect the signal ground of all the instruments together. This is done automatically through the screen of the input and output cables used to interconnect the instruments.

2. If instruments equipped with a mains socket chassis terminal are employed in the measuring arrangement then check that a) one and only of these instruments has its signal ground line connected via chassis to mains ground and b) the housing of the measurement transducer is isolated from grounded measurements sources.

3. If the measurement arrangement is used free standing without the instrument cabinets touching, then ensure that each of the other instruments in the measurement arrangement has its chassis connected to a) mains ground only or b) chassis only. With instruments having a mains socket chassis terminal, a) is to be preferred.

4. If the measurement arrangement is mounted in a metal instrumentation rack, then ensure that one and only one of the instruments has its signal ground line connected to chassis (and chassis connected to mains ground if equipped with a mains socket chassis terminal). If more than one of the instruments has a permanent signal ground chassis connection, then isolate the chassis of these instruments from one another.

3.1.4. Polarization Voltage

The 200 V polarization voltage provided by the 2807 for condenser microphones is preset to within ± 1 V and therefore further adjustment should not normally be necessary. To check the polarization voltage a high input impedance digital voltmeter may be used. This should be connected between the POL. VOLTAGE and CHASSIS GROUND sockets located on the rear panel. The polarization voltage V_{pol} is calculated using the equation:

$$V_{pol} = V_{meas} \left[\frac{200}{R_m} + 1 \right]$$

Where V_{meas} is the measured value and R_m is the rating of the voltmeter used in kΩ. If required, fine adjustment may be made using the ± 10 V polarization voltage adjustment potentiometer. This is located on the main printed circuit board on the right-hand side (viewed from the rear) of the instrument as shown in Fig. 3.2. Access to the circuit board is gained by loosening the right-hand panel fastening screw on the rear of the 2807 and sliding the panel out towards the rear.

⚠ **WARNING:** Disconnect all power from the 2807 before attempting to remove or replace its protective panels. Internal adjustments with mains power connected should be carried out only by skilled persons who are aware of the hazards of dealing with live circuitry.

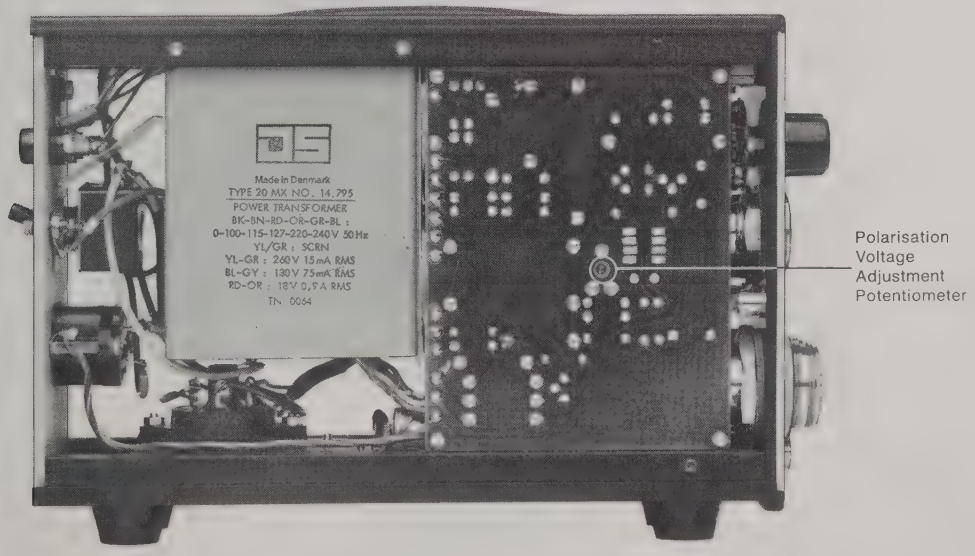


Fig. 3.2. Polarization voltage equipment

3.2. CONNECTION OF B & K MICROPHONE PREAMPLIFIERS AND CONDENSER MICROPHONES

Note: Before connecting the 2807 with other instruments, the preliminary adjustments detailed in section 3.1.2 should be carried out.

The 2807 provides the necessary power for B & K Microphone Preamplifiers and the 200 V polarization required for associated B & K Condenser Microphones via the seven-pin INPUT 1 and INPUT 2 sockets located on the front panel. The instrument is designed for use with B & k Microphone Preamplifiers Types 2633, 2639, 2645 and 2660 which may

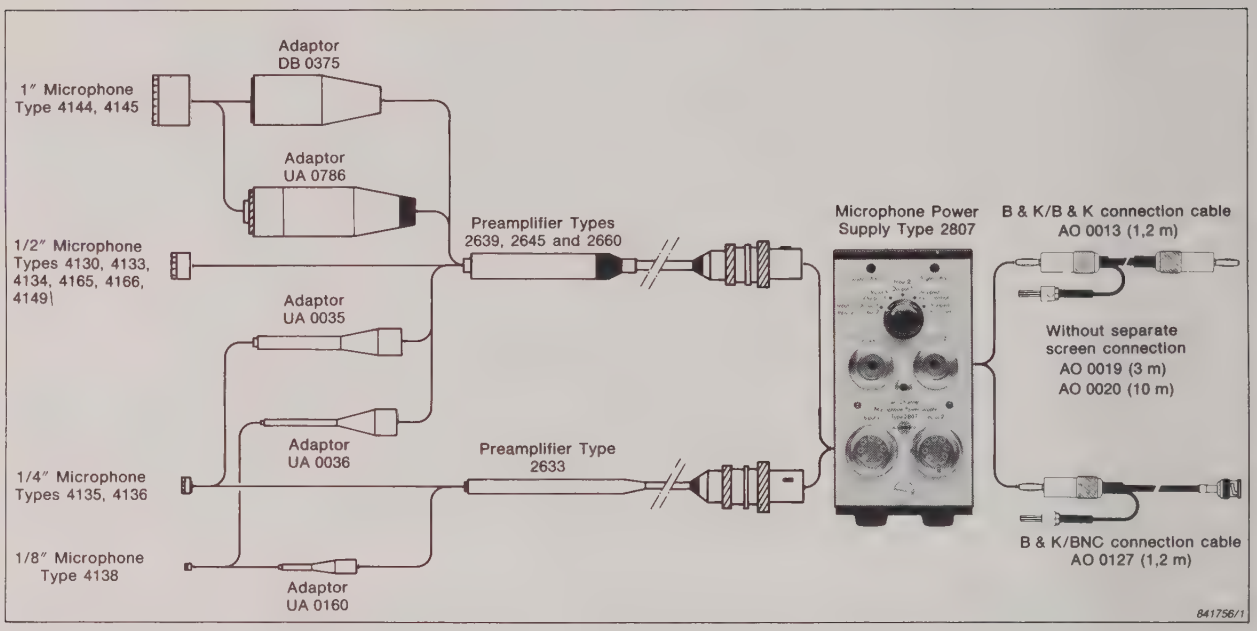


Fig. 3.3. Microphone and Preamplifier combinations which can be used with the 2807

be connected directly to either of the input sockets. Fig. 3.3 indicates the various preamplifier and microphone combinations which may be used directly with the 2807. Earlier B & K Preamplifiers have longer plugs; to fit these to the 2807 input sockets, use Adaptor DB 2609.

The 2807 may also be used with B & K Microphone Preamplifier Type 2642 using the B & K Seven-Pin to Five-Pin Adaptor JP 0713. The JP 0713, shown below in Fig. 3.4 adapts the preamplifier supply voltage from the 2807 to the required operating voltage for the 2642. As supplied the JP 0713 also adapts the 200 V polarization voltage from the 2807 to the 28 V required for Condenser Microphone Type 4130.

Note: If long lengths of cable (relative to the wavelength) are used the user should give due consideration to the question of cable termination to avoid the setting up of standing waves in the cable.

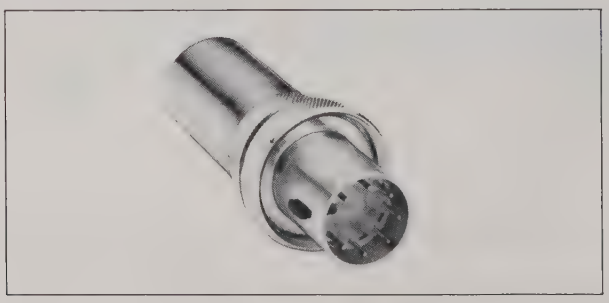


Fig. 3.4. Seven-pin to Five-pin Adaptor JP 0713

3.3. USE OF EXTERNAL CONTROL SOCKET

With the CHANNEL SELECTOR switched to "Chopped Ext. Control", the channel selector relay of the 2807 may be operated remotely by grounding the EXT. CONTROL socket.

The phasing of the relay is such that when the socket is grounded the relay will switch from the output of channel 1 to the output of channel 2. The selected output is available at the OUTPUT 1 socket (either on the front or rear panel), and the OUTPUT 2 socket is grounded.

The channel selector relay may also be operated remotely using the cam switch of a B & K Level Recorder Type 2307. The rate at which the automatic switching between the channels occurs is determined by the setting of the DRIVE SHAFT II SPEED control on the 2307 and the type of cam disc fitted. The chopped signal output from the 2807 may then be filtered in octave bands, amplified, and then recorded on the 2307, enabling a two-channel multiplexed recording to be made on a single chart length of recording paper. This provides a convenient method for measuring the sound reduction due to an enclosure or for testing protective ear muffs.

Fig. 3.5 shows a two-channel multiplexed recording of the sound reduction due to an enclosure using the instruments connected as shown in Fig. 3.6

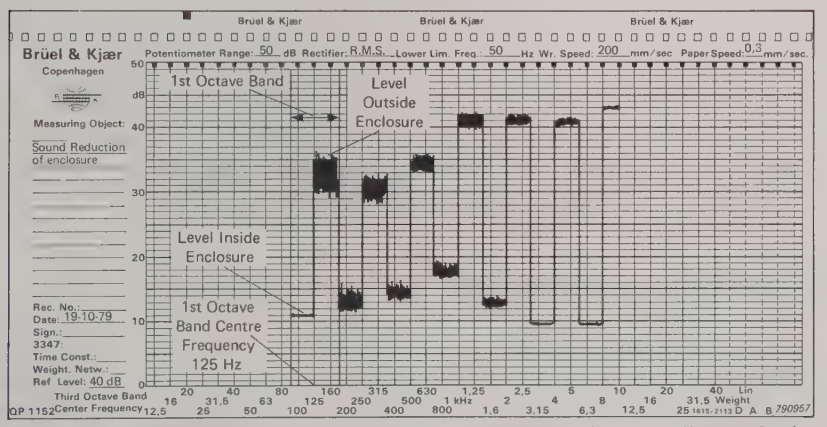


Fig. 3.5. Octave filtered two-channel multiplexed recording of the sound reduction due to an enclosure

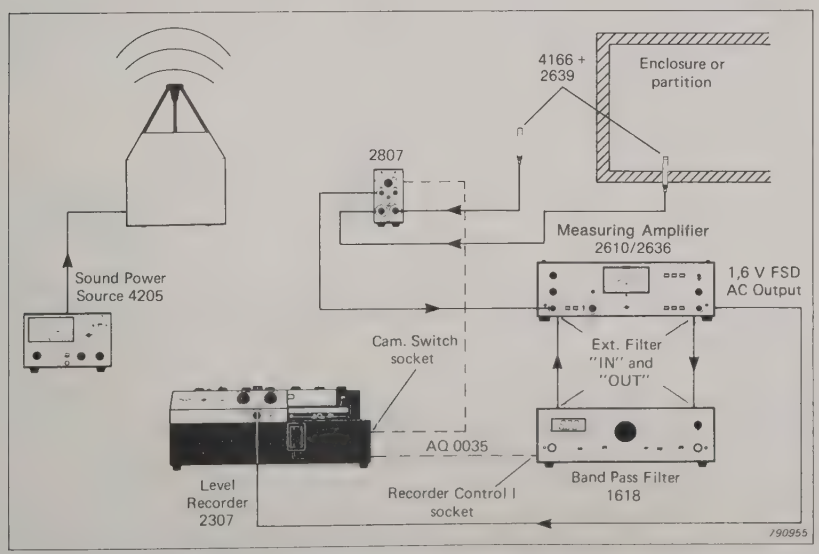


Fig. 3.6. Connection of instruments for measuring the sound reduction due to an enclosure

The Sound Power Source Type 4205 is used to provide wide band noise (100 Hz to 10 kHz), the level of which is monitored both inside and outside the enclosure under test using the microphone and preamplifier combinations shown. The EXT. CONTROL and CHASSIS GROUND sockets on the rear panel of the 2807 are connected to the CAM SWITCH socket of the Level Recorder using a cable as shown in Fig. 3.7. Switching between the two channels is set so that the sound pressure levels inside and outside the enclosure are recorded once in each octave band as illustrated in Fig. 3.5. As shown, the first octave band has a centre frequency of 125 Hz. The SPL inside the enclosure (lower level) is recorded during the first half of the period that the filter remains switched in this band, and the SPL outside (higher level) is recorded during the second half of the period.

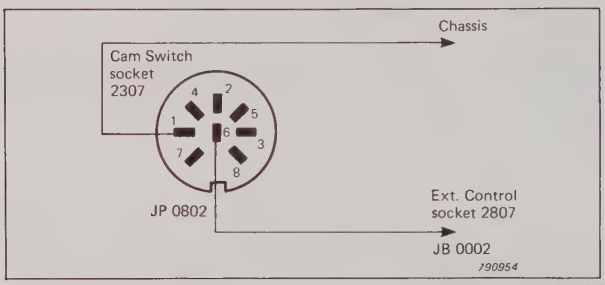


Fig. 3.7. Cable for connection of 2807 to CAM SWITCH socket of 2307. Soldering side of plug JP 0802 shown

3.4. USE OF 2807 IN VIBRATION MEASUREMENTS

The 2807 may also be used as a two-channel selector for vibration measurements using B & K Accelerometers. To connect an accelerometer to one of the channels of the 2807 a Microplug Adaptor JJ 2617 and Microphone Preamplifier Type 2639 are used. The adaptor contains a 50 pF capacitor which blocks the microphone polarization voltage supplied by the 2807 via the 2639. Two such accelerometers may be connected to the 2807 (one to each channel), via a JJ 2617 and 2639 combination. Alternatively, with an accelerometer, JJ 2617 and 2639 combination connected to one channel and a microphone and preamplifier connected to the other, the 2807 may be used in situations where simultaneous acoustic and vibration measurements are being made. For further details of B & K Accelerometers, see the B & K Handbook "Piezoelectric Accelerometers and Vibration Preamplifiers".

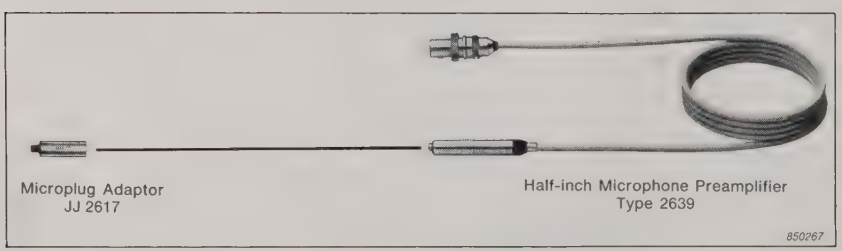
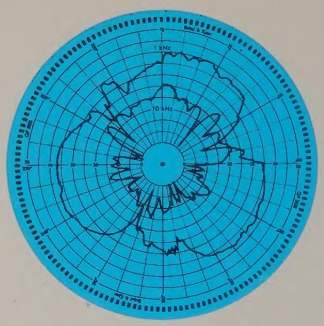
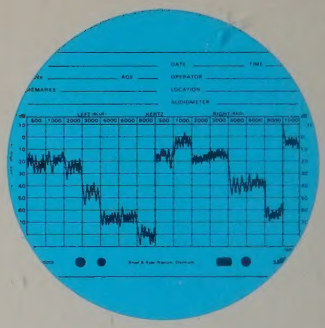


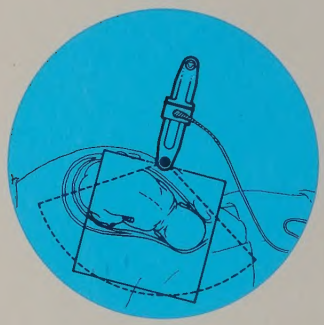
Fig. 3.8. Half-inch Microphone Preamplifier Type 2639 with adaptor JJ 2617 for connection of piezoelectric accelerometers

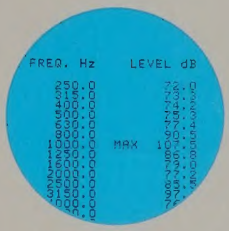
4. SERVICE AND REPAIR

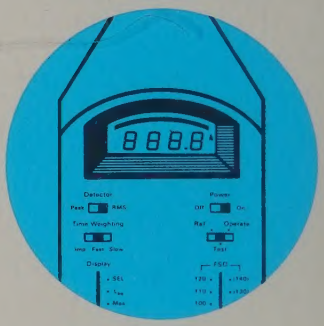
The 2807 is designed and constructed to provide the user with many years of reliable operation. However, should a fault occur which impairs its correct function it should be immediately disconnected from the mains supply and secured against unintended operation. For repair consult the separate Service Instruction Manual available for the 2807 or contact your local B & K service representative. Under no circumstances should repair be attempted by persons not qualified in the service of electronic instrumentation.

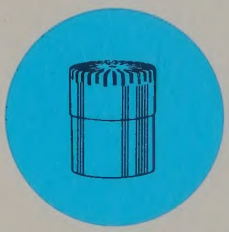


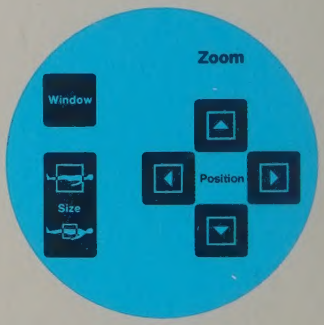


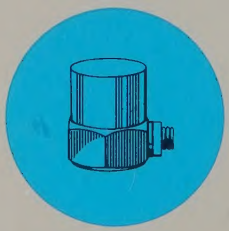


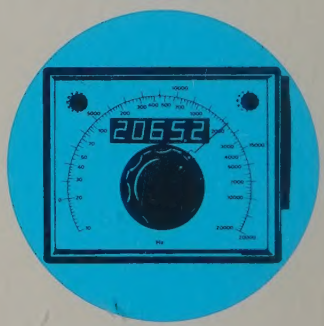


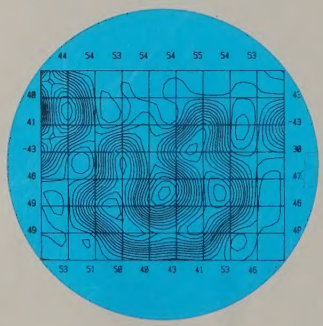












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